STATE OF MONTANA
Department of Administration
INFORMATION TECHNOLOGY SERVICES DIVISION

Brian Schweitzer
Governor

SIEC

Land Mobile Radio Deployment for Public Safety

Definition Statement:

Interoperability refers to the ability of public safety emergency responders to work seamlessly with other systems or products without any special effort. Wireless communications interoperability specifically refers to the ability of public safety officials to share information via voice and data signals on demand, in real time and when needed.

Technical Requirement

The technology needed to meet the Interoperability Definition is that public safety radio communications in Montana will be a standards-based shared system of systems. The radio system will be a wide area system for use by public safety responders.

Through the deployment of a migration plan that identifies the steps and process for each participating agency, the system will combine P25 trunked and P25 digital / analog conventional technologies to provide interoperable communications among P25 narrowband digital trunked and existing conventional users. All equipment must be compatible and seamlessly integrate with infrastructure equipment deployed in CDP 1 - Southwest Interoperability Project and CDP2 - Northern Tier Interoperability Project. It will operate narrowband in the VHF frequency range and will use a protected high-capacity digital microwave backbone for voice and data interconnect traffic.

The system will provide advanced channel management for the shared use of frequencies, seamless roaming throughout the respective trunked areas (footprint) and enhanced responder safety through embedded signaling, while at the same time enhancing interoperable communication with existing legacy VHF radios. At a lower level of interoperability, the current mutual aid channels will be maintained and available for use.

While all agencies recognize the optimum goal of a trunked system, they will need to migrate to trunking in a step/phased approach. With this ultimate goal, however, all agencies will purchase equipment that is trunking capable or upgradeable to trunking. Progression through these steps will vary in a given time based on operational needs, and ultimately funding available.

This approach will allow public safety responders in Montana to exchange voice and data communications on demand, in real time during emergencies and disasters.

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Terms

STANDARDS-BASED

Different community systems operating on the same technology, shared infrastructure with users working on both their own system and shared network; useful in all scales; wide area, seamless coverage is economical due to shared costs.

SHARED SYSTEM OF SYSTEMS

A large widespread collection or network of systems using the same technology functioning together to achieve a common purpose.

WIDE AREA SYSTEM

System that spans a relatively large geographical area, and are often connected through microwave technology. They can also be connected through land lines or satellites.

P25

Project 25 (P25) is a set of standards produced through the joint efforts of the Association of Public Safety Communications Officials International (APCO), the National Association of State Telecommunications Directors (NASTD), selected federal agencies and the National Communications System (NCS), and standardized under the Telecommunications Industry Association (TIA). P25 is an open architecture, user driven suite of system standards that define digital radio communications system architectures capable of serving the needs of Public Safety and Government organizations. The P25 suite of standards involves digital Land Mobile Radio (LMR) services for local, state/provincial and national (federal) public safety organizations and agencies. P25 open system standards define the interfaces, operation and capabilities of any P25 compliant radio system. In other words, a P25 radio is any radio that conforms to the P25 standard in the way it functions or operates. P25 compliant radios can communicate in analog mode with legacy radios and in either digital or analog mode with other P25 radios. The P25 standard exists in the public domain, allowing any manufacturer to produce a P25 compatible radio product.

TRUNKED

A computer controlled communications system, which allocates communication channels for a call (either voice or data) from a "common pool" of available channels, and at the end of that call, returns them to the same "pool" to be reallocated for another call. The controller in the infrastructure, which assigns calls to specific channels, characterizes a trunked system.

ANALOG

Analog radios process sounds into patterns of electrical signals that resemble sound waves.

CONVENTIONAL

A conventional system is characterized by relatively simple geographically fixed infrastructure (such as a repeater network) that serves to repeat radio calls from one frequency to another.

INTEROPERABLE COMMUNICATIONS

Interoperability refers to the ability of public safety emergency responders to work seamlessly with other systems or products without any special effort. Wireless communications interoperability specifically refers to the ability of public safety officials to share information via voice and data signals on demand, in real time and when needed. For example, when communications systems are interoperable, police and firefighters responding to a routine incident can talk to each other to coordinate efforts. Communications interoperability also makes it possible for public safety agencies responding to catastrophic accidents or disasters to work effectively together. Finally, it allows public safety personnel to maximize resources in planning for major predictable events such as the Super Bowl or an inauguration, or for disaster relief and recovery efforts.

NARROWBAND

Narrowband **(***narrow bandwidth*) refers to a signal that occupies only a small amount of space on the radio spectrum -- the opposite of broadband or wideband. Narrowband - half (12.5 kHz) or quarter (6.25 kHz) channel bandwidth as it relates to the new FCC refarming frequency channel plan.

Note: The FCC created a new narrowband channel plan in private land mobile radio (PLMR) bands below 512 MHz and adopted a transition schedule based on the product type acceptance process. Through various means and proposed rule making, the FCC is encouraging users to migrate to narrower channels. 25 kHz of spectrum will be reclaimed for two new 12.5 kHz users or four 6.25 kHz users. The FCC is performing audits of license holders. A lack of response or action by a 25 kHz license-holder may result in a frequency being reclaimed. The FCC's goal is to make additional frequencies available by requiring users to operate more efficiently in reduced bandwidth.

DIGITAL

Any type of information that can be output, transmitted and interpreted as individual bits of binary information, using electrical or electromagnetic signals that can be modulated to convey their specific content.

VHF FREQUENCY RANGE

The part of the radio spectrum from 30 to 300 megahertz, which includes TV channels 2-13, the FM broadcast band, and some marine, aviation and land mobile services.

DIGITAL MICROWAVE

A microwave transmission system that transfers digital information through the modulation of a microwave carrier signal. The type of modulation used may be amplitude, frequency or phase shift, but the digital signal is used as the source of modulation information.

CHANNEL MANAGEMENT

Formal process utilized to manage the creation, staffing, and tasking of channels.

ROAMING

Roaming is the capability to move from one repeater area to another repeater area and obtain service.

EMBEDDED SIGNALING

A method of sending text or commands over the digital radio system using the existing digital stream without interfering with the voice traffic. Usually done by utilizing the "control channel" of a trunked radio system. Examples include: Emergency button, unit identification, vehicle location, test messaging, unit inhibit and call alert.

LEGACY

Legacy System -A communication system or network that satisfies specific business needs using technology or equipment that has become obsolete or is incompatible with new industry standards. To extend the life of existing investments in legacy systems, new technologies or systems are often designed to communicate with legacy systems.

MUTUAL AID CHANNELS

Frequencies established to provide a common radio frequency to be used statewide by state and local public safety agencies during periods of man-made or natural disasters and other emergencies where interagency coordination is required.